REMARKS

Claims 1-25 are pending in the present application, new claims 16-25 are added and claims 1 and 8 are amended herein. Support for new claims 16-25 may be found in Applicants' specification as filed, *e.g.*, at page 5, lines 5-10. The amendments to claims 1 and 8 are purely of a formal nature and do not affect the scope of those claims in any way. The instant Office Action and cited references have been considered. Favorable reconsideration is respectfully requested.

Claims 1-13 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Carter et al. (U.S. Patent No. 3,754,275) in view of Lara (U.S. Patent No. 4,717,875). Claims 14 and 15 stand rejected over Carter in view of Lara and in further view of Casey et al. (U.S. Patent No. 6,965,320). These rejections are respectfully traversed for the following reasons.

Claim 1, as amended, recites a method for external localization of anomalies located in an immersed hollow structure, which anomalies were detected beforehand by a device moving inside the immersed hollow structure, and positioned by counting from an origin, marks located at regular intervals accessible from the inside and the outside of the immersed hollow structure consisting of (a) defining by counting, from the same aforesaid origin, a mark accessible on the outside of the immersed hollow structure; (b) positioning a transponder module on the aforesaid mark, (c) identifying the transponder module by an identification code, and (d) determining the number of marks separating said anomalies and the identified transponder module. This is not taught, disclosed or made obvious by the prior art of record.

Carter teaches that although counting girth welds is a well known method of positioning an inspection apparatus and an anomaly inside a pipe, it is not a reliable one (col. 1, lines 40-50). The method of Carter relies only on time measurements for positioning such an anomaly:

- marker stations are placed along the passage of a pipe and are precisely localized in space (col. 3, lines 24-27),

- a "pig" is sent through the pipe; anomalies and welds are "localized" in time using a first on board Time Code Generator (TCG1) (col. 3, lines 1-4 and 27-39),

- the marker stations detect the passing through of the "pig" and send coded signals to a base station; the base station records these signals in time using a second Time Code Generator (TCG2) synchronized with TCG1, and by so doing the "pig" is localized in space and time at discreet places and moments (col. 3, lines 48-54, col. 3, line 58 - col. 4, line 20).

By correlating the two time recordings, it is possible to precisely localize the anomalies along the pipe. Therefore the use of synchronized time references TCG1 aboard the "pig" and TCG2 at a base station is crucial to Carter.

In addition, marker stations are temporarily deployed along the route of the pipe (col. 3, lines 25-27), which implies a heavy cost and has to be reiterated each time a survey has to be performed. The time references TCG1 and TCG2 aboard respectively of the "pig" and the base station, and the marker stations detecting the passage of the "pig" allow Carter to avoid using any mark relative to the pipe.

Lara teaches the use, onboard a "pig" travelling in a pipe, of a magnetometer for counting, from the launching point of the "pig," the girth welds along the section of pipe to be surveyed. See, e.g., Abstract, col. 5, lines 22-27. The detected anomalies are therefore localized along the pipe from its inside according to the number of welds counted. Lara does not teach how to localize anomalies for repair from the outside of the pipe.

Lara also teaches the use of marker magnets spaced apart on the pipeline at predetermined locations (col. 6, lines 44-46), but fails to explain what these predetermined locations would be and how these markers would help to position anomalies from the outside of the pipe.

The problem of repairing an anomaly, for instance a corroded part, inside a pipeline, is a difficult one. It has been long known to launch an instrumented "pig" inside the pipeline to detect and localize possible damaged parts of the pipe and for so doing, counting marks, for example welds between sections of pipes from an origin is a known solution. For example, a corroded part will be localized, from the inside of the pipe, between welds N and N + 1. However, repair work is carried out from the outside of the pipe from a vessel or a ROV. Therefore, the problem is to transfer this information to the outside of the pipe.

Blanche, in the present application, teaches the use:

- of marks accessible from the inside and the outside of the pipe,

- of a "pig" moving inside a pipe to detect anomalies and localize them inside the pipe using said marks, and

- of a transponder module positioned on the outside of the pipe on a given mark near said anomalies.

Said anomalies are positioned from the outside of the pipe using said transponder module and said marks.

To illustrate the method according to the invention, assume that corroded parts were localized by a "pig" between marks 145 and 146, 151 and 152, and 154 and 155. Counting the marks from the outside and from the same origin, a transponder module TM8 is positioned on mark 140. This transponder module then provides a local reference for the corroded parts from the outside of the pipe: between (TM8 + 5 marks) and (TM8 + 6 marks), between (TM8 + 11 marks) and (TM8 + 12 marks), and between (TM8 + 14 marks) and (TM8 + 15 marks). This will facilitate the repair work because the transponder module is placed permanently on the pipe and is designed to answer an RF interrogation with a unique code.

Therefore, what is used by Blanche are:

- marks accessible from the inside and the outside of the pipe, which provide for a common reference scale both on the inside and the outside of a pipe,

- transponder modules which are permanently positioned on the outer surface of the pipe.

Based on Lara's teaching, it would not have been obvious to the person of ordinary skill in the art to reach Blanche's method. Lara uses a "pig" travelling inside a pipe, positioned counting welds between sections but is not concerned with the repair of

the pipe, only measuring its curvature (col.1, lines 9-10). Therefore, the internal positioning of said curvatures is sufficient.

Lara states that "the number of pipe sections and welds and their locations can of course be predetermined and mapped with respect to known reference points on the earth surface" (col. 3, lines 52-55) but fails to explain how this can be done. The use of "marker magnets spaced apart on the pipe line at predetermined locations" (col. 6, line 44-46) is not helpful because Lara does not explain what these predetermined locations would be and even so, how a magnet, when detected by the "pig," would inform the "pig" of its location. Therefore the problem of transferring on the outside of a pipe a piece of information gathered on the inside of said pipe remains open.

The person ordinarily skilled in the art would not consider Carter's teaching to solve this problem because they turn away from counting welds as a means of positioning. Even so, Carter teaches the use of external marker modules which are temporarily established, away from the pipe, and which are devised to detect the passage of the "pig". This turns the person ordinarily skilled in the art away from the use of transponder modules:

- permanently positioned on the outer surface of the pipe,

- which are not meant to detect the passage of the "pig" but, on the contrary, to provide an outside beacon to the repairing apparatus.

Moreover, Blanche overcomes a preconception that known systems like passive or active beacons permanently placed on the outer surface of an immersed pipe are not efficient because passive beacons are rapidly covered in concretions and

are no longer visible, and the life time of batteries in active beacons is much shorter than the life time of the pipe. Transponder modules are beacons that do not have these drawbacks:

- they can be detected and identified even when they are covered in concretions and are no longer visible, because they will answer an RF interrogation with a unique code,

- they do not rely on batteries.

For at least these reasons, Applicant respectfully submits that claim 1 is patentable over the prior art whether taken alone or in combination as proposed in the instant Office Action. Claims 2-13 and 16-25 depend from and include the limitations of claim 1, and are believed to be patentable in and of themselves, and for the reasons discussed above with respect to claim 1. Casey does not remedy the deficiencies of Carter and Lara. Accordingly, claims 14-15 are also patentable over the cited art.

CONCLUSION

In view of the foregoing, Applicants respectfully submit that independent claim 1, as well as claims 2-25 dependent therefrom, are allowable. Therefore, the Examiner early and favorable of this application and withdrawal of the rejections of record is respectfully solicited, together with the prompt allowance of the amended claims.

If the Examiner has any questions or comments, he is kindly invited to contact the undersigned at (202) 628-5197.

Respectfully submitted,

BROWDY AND NEIMARK, P.L.L.C.
Attorneys for Applicant(s)

By /Ronni S. Jillions/
Ronni S. Jillions
Registration No. 31,979

RSJ:ltm
Telephone No.: (202) 628-5197
Facsimile No.: (202) 737-3528

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